



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,992	01/21/2004	Jhy-Jyi Sze	JCLA11796	4307
23900	7590	10/28/2005	EXAMINER	
J C PATENTS, INC.			MULPURI, SAVITRI	
4 VENTURE, SUITE 250			ART UNIT	
IRVINE, CA 92618			PAPER NUMBER	
			2812	

DATE MAILED: 10/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

7

Office Action Summary	Application No. 10/761,992	Applicant(s) SZE ET AL.	
	Examiner Savitri Mulpuri	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 12-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 12-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in response to the applicant's communication filed on 10/21/2005.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7, 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted prior art in combination with Rhodes et al (US 2004/0178430)

Admitted prior art teaches a method of making image sensor by the following process steps: Providing a substrate having plurality of trenches; forming liner layer on the surface of the trenches ; filling insulation layer in the trenches to form isolation regions; forming at least one photosensitive region with the in the substrate between two neighboring isolation regions; forming anti-reflection layer by chemical vapor deposition method, at least covering the photo sensitive region. Admitted prior art teaches forming photosensitive regions by implantation (see fig 1 A-1 B and related description).

Admitted prior art does not teach forming antireflection layer between liner layer and filling layer. Rhodes et al teaches a method of making image sensor by forming silicon oxide/silicon nitride layer "154" in the trench before filling the trench with

insulation material "150". Rhodes especially mention forming silicon nitride layer to smoothing out the corners in the trench and to reduce stress with in the trenches (see fig. 10fig.13 and fig. 16 and related description para 0044). It would have been obvious to one of ordinary skill in the art to form additional layer of nitride in the invention Admitted prior art to reduce stress, which would built due to filling of the insulation material within in the trench. It is well known in the art that nitride layer is acts as anti-reflection layer (see Hong et al US 6,251,746, col.5, lines 57-60col.6, lines 64-68).

Conclusively, Admitted prior art as modified by the teaching of Rhodes, would reduce the light reflected from the bottom and the side wall of the trenches and increases effective area of the photosensitive region of the image sensor and enhances the current generated at the photo sensitive region.

Response to Arguments

Applicant's arguments filed 10/21/2005 have been fully considered but they are not persuasive. Applicant , at page 5, argues that the instant invention directed to method of fabricating an image sensor device by forming shallow trench isolations formed around the photo sensitive region, there is anti-reflection formed therein to reduce the light reflected from the bottom and the side wall of the trenches and increases effective area of the photosensitive region of the image sensor and enhances the current generated at the photo sensitive region.

However, Rhodes et al teaches forming image sensor, as similar to admitted prior art, with photodiode and transistors with trench isolation regions. Rhodes teaches

oxide/ nitride layer "154" to smoothing out the corners and to reduce stress with in the trench and then filling with material '350". It is agreed with the applicant that Rhodes do not mention nitride being anti-reflection layer, which can resolve the issue of light reflection at the bottom and sidewalls of the shallow trench isolation regions when incident light pass through the shallow trench isolation regions. However, the modified invention of Admitted prior art, as modified by the teaching of Rhodes would not have light reflection when light passes through the shallow trench isolation regions because it is well known that nitride acts as anti-reflection layer. In other words, It would be inherent that the modified invention of admitted prior art as modified by the teachings of Rhodes, that there would not be any light reflection in addition to smoothing the corners and reducing the stress. It is well known in the art that nitride layer is acts as anti-reflection layer (see Hong et al US 6,251,746).

Applicant, at page 6, submits that the material of the anti-reflective layer is not limited to the nitride material and the spirit of the present invention is to form the material layer with anti-reflection property in the shallow trench isolation regions for blocking the reflection from the bottom and the sidewall of the trenches. However, as sated above, the Admitted prior art as modified by the teaching of Rhodes, would reduce the light reflected from the bottom and the side wall of the trenches and increases effective area of the photosensitive region of the image sensor and enhances the current generated at the photo sensitive region.


Applicant, at page, present the explanation of the exhibit A, and such explanation irrelevant to the claims as presently recited.

Art Unit: 2812

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Savitri Mulpuri whose telephone number is 571-272-1677. The examiner can normally be reached on Mon-Fri from 8 a.m. to 4.30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt, can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Savitri Mulpuri
Primary Examiner
Art Unit 2812